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Cross-Reference to Related Application

The present application claims the benefit of U.S. Provisional Patent Application No. 60/096,649 filed on August 14, 1998.

IN THE CLAIMS:

Please amend claims 1, 3, 14, 16, 18, 20, 27 and 28 as follows:

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1. (Amended) A method of applying scatter and attenuation correction to emission tomography images of a region of interest of a subject under observation comprising the steps of:

aligning a three-dimensional computer model representing the density distribution within said region of interest with said emission tomography images, said computer model being created from image data of other subjects thereby to avoid the need to image said subject under observation to create said computer model; and

applying scatter and attenuation correction to said emission tomography images using said aligned computer model as a guide.

A3

3. (Amended) The method of claim 2 wherein during said aligning step, a functional component of said atlas is firstly aligned with said emission tomography images to generate a set of spatial transformation parameters and thereafter, an anatomical component of said atlas is aligned with said emission tomography images using said set of spatial transformation parameters.

A4

14. (Amended) An emission tomography imaging method where emission tomography images of a region of interest of a subject are taken for analysis and are corrected for scatter and attenuation, the method further comprising the step of:

using a three-dimensional computer model approximating the density distribution within the region of interest as a guide to the application of scatter and attenuation correction, said computer model being created from image data of other subjects thereby to avoid the need to image said subject to create said computer model.

16. (Amended) The emission tomography imaging method of claim 15 wherein during said aligning step, a functional component of said atlas is firstly aligned with said emission tomography images to generate a set of spatial transformation parameters and thereafter, an anatomical component of said atlas is aligned with said emission tomography images using said set of spatial transformation parameters.

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18. (Amended) An emission tomography image processing system comprising:

memory storing emission tomography images of a region of interest of a subject under observation;

said memory also storing at least one three-dimensional computer model of said region of interest, said computer model representing the density distribution within said region of interest, said computer model being created from image data of other subjects thereby to avoid the need to image said subject under observation to create said computer model; and

a processor for registering said computer model with said emission tomography images and for applying scatter and attenuation correction to said emission tomography images using said registered computer model as a guide.

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20. (Amended) An emission tomography image processing system as defined in claim 19 wherein said processor firstly registers a functional component of said atlas with said emission tomography images to generate a set of spatial transformation parameters and then registers an anatomical component of said atlas with said emission tomography images using said set of spatial transformation parameters.

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27. (Amended) An emission tomography imaging system comprising:

means for taking emission tomography images of a region of interest of a subject under observation to form a three-dimensional image of said region of interest;

memory to store said emission tomography images, said memory also storing at least one three-dimensional computer model of said region of interest, said computer model representing the density distribution within said region of interest, said

computer model being created from image data of other subjects thereby to avoid the need to image said subject under observation to create said computer model; and

a processor for aligning said computer model with said emission tomography images and for applying scatter and attenuation correction to said emission tomography images using said aligned computer model as a guide.

28. (Amended) A computer readable medium including computer program code for applying scatter and attenuation correction to emission tomography images of a region of interest of a subject under observation, said computer readable medium including:

computer program code for aligning a three-dimensional computer model representing the density distribution within said region of interest with said emission tomography images, said computer model being created from image data of other subjects thereby to avoid the need to image said subject under observation to create said computer model; and

computer program code for applying scatter and attenuation corrections to said emission tomography images using said aligned computer model as a guide.

Please add new claims 30 to 67 as follows:

30. (New) The method of claim 1 wherein said computer model is created from transmission images or x-ray CT scans of the region of interest of other subjects.

31. (New) The method of claim 30 wherein said transmission images or x-ray CT scans are taken from a variety of other subjects and averaged thereby to create said computer model.

32. (New) The method of claim 31 wherein said computer model is in the form of a two-component atlas.

33. (New) The method of claim 32 wherein during said aligning step, a functional component of said atlas is firstly aligned with said emission tomography images to generate a

set of spatial transformation parameters and thereafter, an anatomical component of said atlas is aligned with said emission tomography images using said set of spatial transformation parameters.

34. (New) The method of claim 33 wherein said functional component simulates a SPECT or PET scan of said region of interest and wherein said anatomical component simulates a transmission scan of said region of interest.

35. (New) The method of claim 14 wherein said computer model is created from transmission images or x-ray CT scans of the region of interest of other subjects.

36. (New) The method of claim 35 wherein said transmission images or x-ray CT scans are taken from a variety of other subjects and averaged thereby to create said computer model.

37. (New) The method of claim 36 wherein said computer model is in the form of a two-component atlas.

38. (New) The method of claim 37 wherein during said aligning step, a functional component of said atlas is firstly aligned with said emission tomography images to generate a set of spatial transformation parameters and thereafter, an anatomical component of said atlas is aligned with said emission tomography images using said set of spatial transformation parameters.

39. (New) The method of claim 38 wherein said functional component simulates a SPECT or PET scan of said region of interest and wherein said anatomical component simulates a transmission scan of said region of interest.

40. (New) A method of applying scatter and attenuation correction to emission tomography images of a region of interest of a subject under observation comprising the steps of:

aligning a three-dimensional computer model in the form of a two-component atlas representing the density distribution within said region of interest with said emission tomography images; and

applying scatter and attenuation correction to said emission tomography images using said aligned computer model as a guide.

41. (New) The method of claim 40 wherein during said aligning step, a functional component of said atlas is firstly aligned with said emission tomography images to generate a set of spatial transformation parameters and thereafter, an anatomical component of said atlas is aligned with said emission tomography images using said set of spatial transformation parameters.

42. (New) The method of claim 41 wherein said functional component simulates a SPECT or PET scan of said region of interest and wherein said anatomical component simulates a transmission scan of said region of interest.

43. (New) The method of claim 42 further comprising the step of selecting an atlas from a database of atlases prior to performing said aligning step.

44. (New) The method of claim 40 wherein said computer model is created from transmission images or x-ray CT scans of the region of interest of other subjects.

45. (New) The method of claim 44 wherein said transmission images or x-ray CT scans are taken from a variety of other subjects and averaged thereby to create said computer model.

46. (New) An emission tomography imaging method where emission tomography images of a region of interest of a subject are taken for analysis and are corrected for scatter and attenuation, the method further comprising the step of:

using a three-dimensional computer model in the form of a two-component atlas approximating the density distribution within the region of interest as a guide to the application of scatter and attenuation correction.

47. (New) The emission tomography imaging method of claim 46 wherein during said aligning step, a functional component of said atlas is firstly aligned with said emission tomography images to generate a set of spatial transformation parameters and thereafter, an anatomical component of said atlas is aligned with said emission tomography images using said set of spatial transformation parameters.

48. (New) The emission tomography imaging method of claim 47 wherein said functional component simulates a SPECT or PET scan of said region of interest and wherein said anatomical component simulates a transmission scan of said region of interest.

49. (New) An emission tomography image processing system comprising:

memory storing emission tomography images of a region of interest of a subject;

said memory also storing at least one three-dimensional computer model of said region of interest, said computer model being a two-component atlas representing the density distribution within said region of interest; and

a processor for registering said computer model with said emission tomography images and for applying scatter and attenuation correction to said emission tomography images using said registered computer model as a guide.

50. (New) An emission tomography image processing system as defined in claim 49 wherein said processor firstly registers a functional component of said atlas with said emission tomography images to generate a set of spatial transformation parameters and then

registers an anatomical component of said atlas with said emission tomography images using said set of spatial transformation parameters.

51. (New) An emission tomography image processing system as defined in claim 50 wherein said functional component simulates a SPECT or PET scan of said region of interest and wherein said anatomical component simulates a transmission scan of said region of interest.

52. (New) An emission tomography image processing system as defined in claim 51 wherein said memory stores a database of atlases.

53. (New) The method of claim 49 wherein said computer model is created from transmission images or x-ray CT scans of the region of interest of other subjects.

54. (New) The method of claim 53 wherein said transmission images or x-ray CT scans are taken from a variety of other subjects and averaged thereby to create said computer model.

55. (New) An emission tomography imaging method comprising the steps of:

obtaining emision tomography images of a region of interest of a subject under observation;

aligning a three-dimensional computer model representing the density distribution within said region of interest with said emission tomography images without requiring said subject to be imaged to create said computer model; and

applying scatter and attenuation correction to said emission tomography images using said aligned computer model as a guide.

56. (New) The method of claim 55 wherein said computer model is in the form of a two-component atlas.

57. (New) The method of claim 56 wherein during said aligning step, a functional component of said atlas is firstly aligned with said emission tomography images to generate a set of spatial transformation parameters and thereafter, an anatomical component of said atlas is aligned with said emission tomography images using said set of spatial transformation parameters.

58. (New) The method of claim 57 wherein said functional component simulates a SPECT or PET scan of said region of interest and wherein said anatomical component simulates a transmission scan of said region of interest.

59. (New) The method of claim 58 wherein said region of interest is the head and wherein said functional component is the brain component of a head atlas.

60. (New) The method of claim 58 wherein said region of interest is the heart, said functional component of said atlas simulating a cardiac image and said anatomical component of said atlas representing anatomical features of the thorax.

61. (New) The method of claim 60 wherein the anatomical features of the thorax include:

soft-tissues such as the heart, liver, muscle, and fat;

very low-density soft-tissues such as the lungs; and

high-density tissues such as bone and cartilage in the ribs and spine.

62. (New) The method of claim 57 further comprising the step of selecting an atlas from a database of atlases prior to performing said aligning step.

63. (New) The method of claim 62 wherein said selecting step is performed manually.